9-6-1984

Test 1541: Massey-Ferguson 699 Diesel 12-Speed

Tractor Museum
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NEBRASKA TRACTOR TEST 1541—MASSEY FERGUSON 699 DIESEL 12 SPEED

POWER TAKE-OFF PERFORMANCE

Power Hp (kW)	Crank shaft speed rpm	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temperature °F (°C) Cooling medium	Air wet bulb	Air dry bulb	Barometer inch Hg (kPa)
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—627 rpm)								
85.79	2200	5.346	0.434	16.05	178	64	75	29.00
(63.98)		*(20.233)*	*(0.264)*	*(3.162)*	*(81.1)*	*(17.6)*	*(24.1)*	*(97.93)*
Standard Power Take-off Speed (540 rpm)—One Hour								
78.00	1894	4.598	0.411	16.96	177	65	74	29.02
(58.17)		*(17.405)*	*(0.250)*	*(3.342)*	*(80.5)*	*(18.3)*	*(23.4)*	*(98.00)*
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
76.19	2299	4.875	0.446	15.63	176	69	79	.....
(56.82)		*(18.454)*	*(0.271)*	*(3.079)*	*(80.0)*	*(20.3)*	*(26.1)*	.....
0.00	2389	1.812	.....	.....	171	64	76	.....
(0.00)		*(6.857)*	.....	.....	*(76.9)*	*(17.8)*	*(24.2)*	.....
38.75	2337	3.197	0.575	12.12	172	64	75	.....
(28.90)		*(12.102)*	*(0.350)*	*(2.388)*	*(77.8)*	*(17.8)*	*(23.6)*	.....
85.71	2201	5.336	0.434	16.06	178	67	78	.....
(63.91)		*(20.197)*	*(0.264)*	*(3.164)*	*(81.1)*	*(19.2)*	*(25.3)*	.....
19.58	2364	2.380	0.847	8.23	172	66	76	.....
(14.60)		*(9.007)*	*(0.515)*	*(1.621)*	*(77.5)*	*(18.9)*	*(24.2)*	.....
57.50	2313	3.989	0.484	14.42	174	65	76	.....
(42.88)		*(15.099)*	*(0.294)*	*(2.840)*	*(78.6)*	*(18.1)*	*(24.4)*	.....
Av 46.29	**2317**	**3.598**	**0.542**	**12.87**	**174**	**66**	**76**	**29.03**
Av (34.52)		***(13.619)***	***(0.330)***	***(2.534)***	***(78.7)***	***(18.7)***	***(24.6)***	***(98.01)***

DRAWBAR PERFORMANCE
(Front Wheel Drive Disengaged)

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr (l/h)	lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp. °F (°C) Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg (kPa)
Maximum Available Power—Two Hours 7th (1LH) Gear											
70.52	5632	4.70	2199	7.42	5.221	0.516	13.51	174	40	49	29.33
(52.59)	*(25.05)*	*(7.56)*			*(19.763)*	*(0.314)*	*(2.661)*	*(78.9)*	*(4.2)*	*(9.2)*	*(99.03)*
75% of Pull at Maximum Power—Ten Hours 7th (1LH) Gear											
57.76	4296	5.04	2311	5.34	4.563	0.551	12.66	174	45	50	29.20
(43.07)	*(19.11)*	*(8.11)*			*(17.271)*	*(0.335)*	*(2.494)*	*(78.7)*	*(7.1)*	*(9.7)*	*(98.59)*
50% of Pull at Maximum Power—Two Hours 7th (1LH) Gear											
39.59	2864	5.18	2335	3.78	3.722	0.655	10.64	172	38	44	29.43
(29.52)	*(12.74)*	*(8.34)*			*(14.089)*	*(0.399)*	*(2.095)*	*(77.8)*	*(3.1)*	*(6.4)*	*(99.38)*
50% of Pull at Reduced Engine Speed—Two Hours 9th (2LH) Gear											
39.62	2863	5.19	1558	3.68	2.869	0.505	13.81	172	40	50	29.42
(29.54)	*(12.74)*	*(8.35)*			*(10.859)*	*(0.307)*	*(2.720)*	*(77.8)*	*(4.2)*	*(9.7)*	*(99.33)*
MAXIMUM POWER IN SELECTED GEARS											
50.64	8718	2.18	2307	12.22	4th (2HL) Gear			173	38	45	29.42
(37.76)	*(38.78)*	*(3.51)*						*(78.1)*	*(3.3)*	*(7.2)*	*(99.35)*
68.83	8606	3.00	2201	12.10	5th (3LL) Gear			174	38	45	29.42
(51.33)	*(38.28)*	*(4.83)*						*(78.6)*	*(3.3)*	*(7.2)*	*(99.35)*
69.41	6571	3.96	2200	8.70	6th (3HL) Gear			174	39	48	29.38
(51.76)	*(29.23)*	*(6.38)*						*(78.9)*	*(3.9)*	*(8.9)*	*(99.21)*
71.71	5728	4.69	2200	7.52	7th (1LH) Gear			174	40	49	29.31
(53.47)	*(25.48)*	*(7.56)*						*(78.9)*	*(4.4)*	*(9.4)*	*(98.98)*
69.57	4286	6.09	2199	5.78	8th (1HH) Gear			174	39	48	29.38
(51.88)	*(19.06)*	*(9.80)*						*(78.9)*	*(3.9)*	*(8.9)*	*(99.21)*
69.76	3612	7.24	2200	4.88	9th (2LH) Gear			174	39	48	29.36
(52.02)	*(16.07)*	*(11.66)*						*(78.9)*	*(3.9)*	*(8.9)*	*(99.14)*
66.45	2673	9.32	2201	3.82	10th (2HH) Gear			174	39	48	29.36
(49.55)	*(11.89)*	*(15.01)*						*(78.9)*	*(3.9)*	*(8.9)*	*(99.14)*

Department of Agricultural Engineering

Dates of Test: September 6-28, 1984

Manufacturer: MASSEY FERGUSON S.A. Avenue Blaise Pascal, 60026 Beauvais, France

FUEL, OIL AND TIME: Fuel No. 2 Diesel **Cetane No.** 46.8 (rating taken from oil company's inspection data) **Specific gravity converted to 60/60°F *(15/15°C)*** 0.8374 **Fuel weight** 6.972 lbs/gal *(0.836 kg/l)* **Oil SAE** 15W-40 **API service classification** SE, SF, CC, CD **To motor** 3.626 gal *(13.727 l)* **Drained from motor** 3.247 gal *(12.293 l)* **Transmission and final drive lubricant** Massey Ferguson Permatran III fluid **Total time engine was operated** 51.5 hours.

ENGINE: Make Perkins Diesel **Type** six cylinder vertical **Serial No.** TWU708782K **Crankshaft** lengthwise **Rated rpm** 2200 **Bore and stroke** 3.875″ × 5.0″ *(98.4 mm × 127 mm)* **Compression ratio** 16.0 to 1 **Displacement** 354 cu in *(5802 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and centrifugal precleaner **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil, radiator for power steering fluid **Fuel filter** two paper elements **Muffler** vertical **Cooling medium temperature control** two thermostats.

CHASSIS: Type front wheel assist **Serial No.** △699RUT105043△ **Tread width** rear 60″ *(1524 mm)* to 96″ *(2438 mm)* front 66″ *(1682 mm)* to 74″ *(1886 mm)* **Wheel base** 101.4″ *(2576 mm)* **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 39.0″ *(990 mm)* Vertical distance above roadway 41.5″ *(1054 mm)* Horizontal distance from center of rear wheel tread 0″ *(0 mm)* to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio **Advertised speeds mph *(km/h)*** first 1.2 *(2.0)* second 1.6 *(2.5)* third 1.8 *(2.9)* fourth 2.3 *(3.7)* fifth 3.4 *(5.4)* sixth 4.3 *(6.9)* seventh 5.0 *(8.0)* eighth 6.4 *(10.2)* ninth 7.5 *(12.1)* tenth 9.5 *(15.3)* eleventh 13.8 *(22.1)* twelfth 17.5 *(28.2)* reverse 1.8 *(2.9)*, 2.3 *(3.7)*, 7.5 *(12.1)*, 9.5 *(15.3)* **Clutch** single dry disc operated by foot pedal **Brakes** multiple wet disc hydraulically operated by two foot pedals which can be locked together and mechanically by hand lever **Steering** hydrostatic **Turning radius** (on concrete surface with brake applied) right 180.5″ *(4.58 m)* left 183″ *(4.65 m)* (on concrete surface without brake) right 208.5″ *(5.30 m)* left 213.5″ *(5.42 m)* **Turning space diameter** (on concrete surface with brake applied) right 376″ *(9.55 m)* left 381″ *(9.68 m)* (on concrete surface without brake) right 432″ *(10.97 m)* left 442″ *(11.23 m)* **Power take-off** 540 rpm at 1894 engine rpm and 1000 rpm at 1900 engine rpm **Unladen tractor mass** 10150 lb *(4604 kg)*.

LUGGING ABILITY IN 7th (1LH) GEAR

Crankshaft Speed rpm	2200	1981	1755	1542	1318	1094
Pull—lbs	5728	5950	6179	6315	6519	6386
(kN)	*(25.48)*	*(26.47)*	*(27.49)*	*(28.09)*	*(29.00)*	*(28.41)*
Increase in Pull %	0	4	8	10	14	11
Power—Hp	71.71	66.81	61.27	54.90	48.29	39.35
(kW)	*(53.47)*	*(49.82)*	*(45.69)*	*(40.94)*	*(36.01)*	*(29.34)*
Speed—Mph	4.69	4.21	3.72	3.26	2.78	2.31
(km/h)	*(7.56)*	*(6.78)*	*(5.98)*	*(5.25)*	*(4.47)*	*(3.72)*
Slip %	7.52	7.66	8.05	8.31	8.57	8.44

TRACTOR SOUND LEVEL WITH CAB	Front Wheel Drive Engaged dB(A)	Front Wheel Drive Disengaged dB(A)
Maximum Available Power—Two Hours	82.0	81.5
75% of Pull at Maximum Power—Ten Hours		82.5
50% of Pull at Maximum Power—Two Hours		82.5
50% of Pull at Reduced Engine Speed—Two Hours		79.5
Bystander in 12th (3HH) gear		88.5

DRAWBAR PERFORMANCE
(Front Wheel Drive Engaged)

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp. °F *(°C)* Cool-ing med	Air wet bulb	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Available Power—Two Hours 7th (1LH) Gear											
69.33	5328	4.88	2200	5.75	5.207	0.524	13.32	175	40	49	29.28
(51.70)	*(23.70)*	*(7.85)*			*(19.709)*	*(0.318)*	*(2.623)*	*(79.2)*	*(4.4)*	*(9.4)*	*(98.87)*
MAXIMUM POWER IN SELECTED GEARS											
65.81	11620	2.12	2275	14.91	4th (2HL) Gear			173	38	45	29.42
(49.08)	*(51.69)*	*(3.42)*						*(78.3)*	*(3.3)*	*(7.2)*	*(99.35)*
70.36	5403	4.88	2201	5.82	7th (1LH) Gear			175	40	49	29.30
(52.47)	*(24.03)*	*(7.86)*						*(79.4)*	*(4.4)*	*(9.4)*	*(98.94)*

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	Two 18.4-34; 6; 16 *(110)*	Two 18.4-34; 6; 16 *(110)*
Ballast	—Liquid (each)	1050 lb *(476 kg)*	None
	—Cast Iron (each)	210 lb *(95 kg)*	None
Front Tires	—No., size, ply & psi *(kPa)*	Two 14.9-24; 6; 20 *(140)*	Two 14.9-24; 6; 20 *(140)*
Ballast	—Liquid (each)	None	None
	—Cast Iron (each)	45 lb *(21 kg)*	None
Height of Drawbar		17 in *(430 mm)*	17 in *(430 mm)*
Static Weight with Operator	—Rear	8945 lb *(4057 kg)*	6425 lb *(2914 kg)*
	—Front	3990 lb *(1810 kg)*	3900 lb *(1769 kg)*
	—Total	12935 lb *(5867 kg)*	10325 lb *(4683 kg)*

THREE POINT HITCH PERFORMANCE

Observed Maximum Pressure psi *(kpa)*	3100	*21370*
Location	trailer tipping connection	
Hydraulic oil temperature °F *(°C)*	193	*89*
Location	sump	

	Maximum Lift Capacity		Lift Capacity for Transport
QUICK ATTACH	no		
CATEGORY	II		*not measured
LOAD lbs *(kg)*	5212	*2364*	
TIME sec	5.05		
HITCH POINT MOVEMENT in *(mm)*			
Lowest position	12.6	*321*	
Top of timed range	36.8	*933*	
Highest position	37.4	*949*	
LOAD CG MOVEMENT in *(mm)*			
Lowest position	11.2	*284*	
Top of timed range	39.0	*991*	
Highest position	39.8	*1011*	

*Implement load capacity for transport purposes not specified by manufacturer.

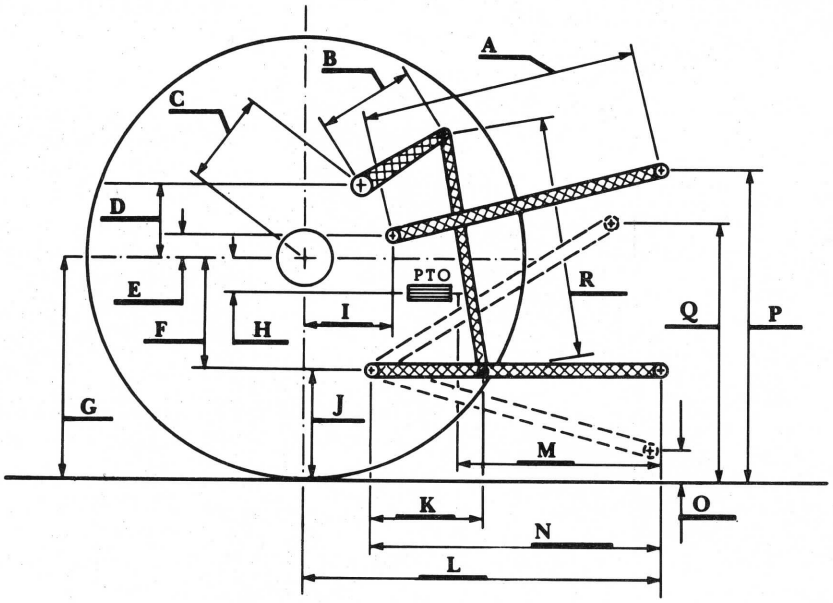
REPAIRS and ADJUSTMENTS: No repairs or adjustments.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test codes and the technically equivalent ISO test codes or official Nebraska test procedure. For the maximum power tests, the fuel temperature at the injection pump was maintained at 151°F *(66.4°C)*. Seven gears were chosen between tire tangential pull limit and 15% slip. During the warmup on the drawbar, a wrong gear ratio was discovered. The gear set was replaced and tests continued.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1541,** December 3, 1984.

LOUIS I. LEVITICUS
Engineer-in-Charge

K. VON BARGEN
W. E. SPLINTER
L. L. BASHFORD
Board of Tractor Test Engineers



Hitch Dimensions as Tested — No Load

	inch	*mm*
A	31.8	*806*
B	10.5	*267*
C	11.9	*302*
D	9.2	*234*
E	8.1	*206*
F	8.4	*213*
G	28.8	*731*
H	5.0	*127*
I	7.3	*185*
J	20.4	*518*
K	21.5	*546*
L	38.8	*984*
M	23.4	*594*
N	40.0	*1016*
O	8.0	*203*
P	39.4	*1000*
Q	33.5	*851*
R	27.8	*705*

Massey Ferguson 699 Diesel

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